

## Improving the Cloud Provider Ranking in the INDIGO PaaS Orchestration System with AI Techniques

The INFN Cloud platform's federation middleware is based on the INDIGO PaaS Orchestration system, which allows handling high-level deployment requests from users while orchestrating the deployment process across the IaaS platforms made available by the federated Cloud providers. Currently, the INDIGO PaaS Orchestrator determines which provider use for creating a deployment based on an ordered list of providers selected according to the user's group. This list is provided by the Cloud Provider Ranker (CPR) service, which applies a ranking algorithm using a limited set of metrics related to the user's request and the Service Level Agreements defined for the providers. The INDIGO PaaS Orchestrator submits the deployment to the first provider on the list and, in case of failure, moves to the next provider until the list is exhausted.

This contribution presents the ongoing activity aimed at improving the provider ranking system by leveraging a broader set of metrics and Artificial Intelligence (AI) techniques. In particular, we introduced Kafka as a message broker to collect heterogeneous information, such as resource usage in federated providers, data on past deployments, and the resources requested by users for new deployments. We then developed the AI-ranker service, based on MLFlow, to replace the CPR, for training and inference of Machine Learning models using the messages read from specific Kafka topics. The ranked list of providers is generated by the AI-ranker by combining the prediction of deployment success/failure with the estimated deployment creation time.

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